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granulitized and then drawn out into lenticular areas. The feldspars of the gneisses appear to have been recrystallized, since the feldspathic areas consist of single feldspar individuals and not fragments of grains. The pyroxene also differs from the gabbro pyroxene. It has lost its characteristic black inclusions and has assumed a deep green color. This mineral, as well as the hornblende, which is abundant in the gneisses, are both regarded as having recrystallized, the augite material coming from the original augite of the gabbro and the hornblende from the secondary amphibole so common in the gabbro. The gneisses are thus schistose gabbros in which recrystallization has taken place with attendant granulitization. The author points out the fact that in the first stages in the alteration of the gabbro scaly hornblende and scapolite are formed, while in the final stage they have completely disappeared, and in this latter stage there results a gneiss which bears no evidence of having been crushed.

Notes.—The serpentine near Bryn Mawr, Penna., has resulted by the alteration of a peridotite according to Miss Bascom.⁸ The rock of the Conshohocken dyke is a typical diabase.

GEOLOGY AND PALEONTOLOGY.

Fossil Jelly Fishes.—Certain curious forms, locally known as “star cobbles,” have long been found in the middle Cambrian shales and limestones of the Coosa Valley, Alabama. They occur at two horizons associated with silicious concretions. The “star cobbles” are recognized by Mr. Walcott as fossil medusæ, and among the 8,000 specimens now in the collections of the U. S. Geological Survey he has separated two types allied to the recent Discomedusæ. From the large number of specimens that have been found over a relatively small area, it is evident that they were gregarious and very much like the modern Rhizostome (*Polyclonia frondosa*) in their habits.

The author describes three species, and refers them to two new genera, *Brooksella* and *Laotira*, which he also defines. These forms, *Brooksella alternata*, *B. confusa* and *Laotira cambria*, together with *Dactyloidites asteroides*, the author groups in the family Brooksellidæ, and gives a diagnosis of the family.

⁸ Proc. Amer. Acad. Science, 1890, p. 220.

A number of drawings of different views of the three specimens described accompany the paper. (Proceeds. U. S. Natl. Mus., Vol. XVIII, No. 1086, 1896.)

Is Palæospondylus a Marsipobranch?—In a collection of fossil fishes belonging to Columbia College, Mr. Bashford Dean has found a specimen of Palæospondylus presenting structural details which decidedly oppose the hitherto accepted view that Palæospondylus is a paleozoic lamprey. Mr. Dean figures the specimen in question, and presents the positive and negative evidence as to its marsipobranchian affinity. From this summarized statement it is seen that the cranium, vertebral column and paired fins do not bear out the theory; the caudal fin is essentially marsipobranchian, but its diphyccercal, or, perhaps, heterocercal condition, is also common to many groups, shark, lung fish, and teleostome. The only characteristic which Palæospondylus retains allying it with the Cyclostomes is the presence of tentacles in the anterior head region. The author suggests that in the presence of so much negative evidence the head-tentacles can hardly be taken as a crucial test of kinship, since it is quite possible for these structures to have arisen independently within the group to which Palæospondylus belongs. (Trans. N. Y. Acad. Sci., Vol. XV.)

The Skeleton of Aepyornis.—A small collection of remains of the extinct birds of the genus Aepyornis, obtained from central Madagascar, has been sent to England by Dr. Forsyth-Major. The specimens include portions of two skulls, two imperfect mandibles, some coraco-scapulæ, a nearly perfect sternum, and some small bones supposed to be rudimentary humeri. A detailed description of these bones is given in a recent number of *The Ibis* by Mr. Charles W. Andrews. Of the skull he remarks that "in several respects Aepyornis approaches the Dinornithidæ in the structure of the skull. Among the points of resemblance are the pedunculate occipital condyle, the prominent basi-temporal platform, the open Eustachian groove, the structure of the facet for the quadrate, and the presence of the frontal crest of large feathers (as in some of the Dinornithidæ)."

The sternum is "ratite," and in Apteryx is found the closest resemblance to Aepyornis. According to the author the fossil sternum appears to lack a metasternal region, and consists of the two primitive costosternal elements only. In this respect it corresponds to an embryonic stage in the development of the sternum in the recent Ratitæ.

The coracoscapula is typically Struthious in form. Its similarity to that of Casuarius gives support to Milne-Edwards and Grandidier's

opinion that *Casuaris* is a near ally of *Aepyornis*. (The Ibis, July, 1896.)

Geological News. MESOZOIC.—Mr. C. W. Andrews has published a paper on the structure of the Plesiosaurian skull, in which he institutes a comparison of the palatal portion with that of other Reptilia. He shows that while a similarity of structure in that region does not necessarily imply close relationship, nevertheless the very great resemblances existing between the Plesiosaurian and Rhynchocephalian palates, reinforced by the numerous other points of likeness in other portions of their skeletons, lead to the conclusion that the Sauropterygia, notwithstanding their single temporal arcade and the rhizodont dentition, are descended from a primitive Rhynchocephalian reptile. This conclusion is in accord with the opinion already expressed by several writers. (Quart. Journ. Geol. Soc., May, 1896.)

CENOZOIC.—A restoration of *Hoplophoneus occidentalis* Leidy has recently been completed by Mr. E. S. Riggs, under the direction of Dr. Williston. The material upon which its restoration is based is composed of parts of two skeletons found almost together and in exactly the same horizon just below the *bullatus* layer of the Oreodon beds of South Dakota. This material now forms part of the paleontological collection of the University of Kansas. (Thesis for the Degree of A. M. in the Kansas Univ., 1896.)

—In a paper on recent and fossil Tapirs, Mr. J. B. Hatcher describes a new species of *Protapirus* from the Protoceras beds of the White River (Oligocene) of S. Dakota, presenting some new facts as to the osteology of the skull and forelimb of this genus. He also gives additional characters diagnostic of the various species of *Protapirus* and *Colodon* already described by Leidy, Marsh, Wortman, Earle and Osborn; points out the distinctive osteological and dental characters in the skulls of the five generally accepted species of recent Tapirs; and reviews the previous work of others on the Phylogeny of the Tapiridæ and Helaletidæ. (Amer. Journ. Sci., Vol. I, 1896.)

—A restoration of the skeleton of *Aptornis defossor* has been completed for the British Museum (Nat. Hist.). The bones from which the specimen is reconstructed were found in 1889 in a chasm in the limestone at Castle Rocks, Southland, New Zealand, the greater number of them no doubt belonging to a single bird. Mr. C. W. Andrews gives a brief description of this skeleton, calling atten-

tion to the great size of the anterior vertebræ in the cervical region, and the peculiar long, slender coracoids which are ankylosed with the much reduced sternum. The figure accompanying the text shows the probable position of the scapula in relation to the coracoid, the coraco-scapular angle being very obtuse, as in most flightless birds; the humerus is proportionally small, and its pectoral crest is reduced to a mere tubercle. (Geol. Mag., London, June, 1896.)

GENERAL.—According to C. D. Perrine, thirty-three distinct earthquakes were felt in California during the year 1894. This does not include a series of over one hundred shocks in Virginia, Nev., during the week of November 16–22, nor heavy earthquakes and volcanic disturbances which occurred in the New Hebrides group of islands during October and November. (Bull. U. S. Geol. Surv., No. 129, Washington, 1895.)

BOTANY.¹

The Teaching of Elementary Botany.—That the teaching of elementary botany in this country is, to say the least, very poor, is a statement which needs no argument to prove its correctness. Much of the botany of the public schools is a wretched attempt at doing something which neither teachers nor pupils understand. In some places the pupil is made to con the pages of a text-book in which emphasis is laid upon minute and meaningless anatomical details of the structure of a few flowering plants. Elsewhere field-work, so-called, is required of the pupil; but here again the chaff is carefully separated from the grain, and *the pupil is given the chaff*. Thus he is made to fill out vacancies in blanks (called “schedules”) in which the unimportant structural characters receive as much attention as those which are significant, the result being a description which neither describes nor separates the plant under consideration from dozens of others. The meaning of any structure is entirely overlooked, while the pupil is compelled to give much time and labor to unimportant details.

There are two reasons for this condition of things: first, the little knowledge of the science of Botany possessed by many teachers; and second, the absence of any definite idea on the part of teachers of the culture-value of Botany in the education of the pupil. To remedy the first the colleges and universities are opening summer schools for

¹ Edited by Prof. C. E. Bessey, University of Nebraska, Lincoln, Nebraska.